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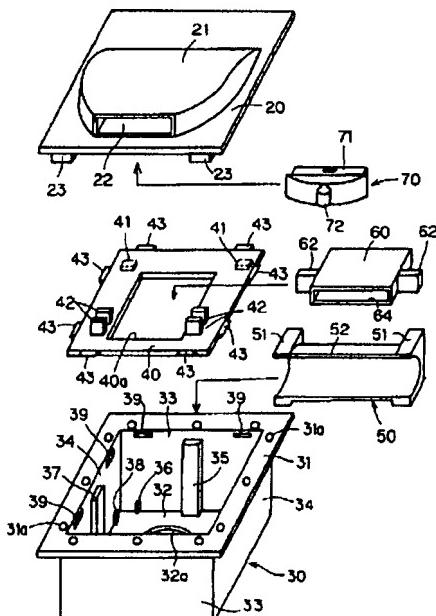
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(54)【発明の名称】 光コンセント

(57)【要約】

【課題】 コネクタの差込む方向を簡易な機構で適宜変更可能な光コンセントを提供すること。

【解決手段】 アダプタ固定台40は、ガイド部材50とともに、箱本体30の底部32に垂直な中心軸の回りの4方向に簡易に着脱可能に固定できる。また、カバー20も、ガイド部材50やアダプタ固定台40とともに、箱本体30の底部32に垂直な中心軸の回りの4方向に簡易に着脱可能に固定できる。したがって、箱本体30を壁に固定したままで、ガイド部材50、アダプタ固定台40、アダプタ60、カバー20等を90°づつ回転した位置に着脱自在に固定することができ、光ファイバーケーブルFCを上下左右の所望の方向に引出すことができる。したがって、光ファイバーケーブルFCの取り回しの際の曲げによって生じる伝送損失を低減することができ、家具等の設備の背面の押さえつけによる光ファイバーケーブルFCの破損のおそれも低減することができる。



【特許請求の範囲】

【請求項1】 一対の光ファイバーケーブルを接続するための中継アダプタを収容する光コンセントであって、底部中央に一方の光ファイバーケーブルを通す引込穴を有する本体部と、当該本体部の上部を覆うとともに他方の光ファイバーケーブルの先端に設けたコネクタを差込むための開口を有する上蓋部とによって構成され、前記開口を外周4方向に選択的に向けた状態で前記上蓋部が前記本体部に着脱自在なケース部と、

前記一方の光ファイバーケーブルの許容最小曲げ半径よりも大きな曲率半径の半円筒状の外周面を有するガイド部材と、

前記ガイド部材を、前記外周面が前記本体部の4つの側壁の任意の1つに対向しつつ当該外周面の軸が底面に平行になる状態で、前記本体部に着脱可能に支持する支持部材と、

前記引込穴を経て前記外周面に沿って案内された前記一方の光ファイバーケーブルの先端に設けたコネクタを一端に嵌合させたアダプタを、当該アダプタの他端が前記上蓋部に設けた前記開口に対向するように前記本体部側に支持するアダプタ固定手段とを備える光コンセント。

【請求項2】 前記アダプタ固定手段は、前記本体部の上端側に着脱可能に固定される中蓋部材であることを特徴とする請求項1記載の光コンセント。

【請求項3】 前記アダプタ固定手段は、前記アダプタをこのアダプタの軸が前記本体部の上端を含む平面に対してほぼ平行になるよう保持することを特徴とする請求項1記載の光コンセント。

【請求項4】 前記アダプタ固定手段は、前記アダプタをこのアダプタの軸が前記本体部の上端を含む平面に対して所定以上の角となるよう保持することを特徴とする請求項1記載の光コンセント。

【請求項5】 前記上蓋部は、前記開口に前記他方の光ファイバーケーブルの先端に設けたコネクタが差し込まれていないときに当該開口を塞ぐキャップを当該開口周辺に保持するホルダを備えることを特徴とする請求項1記載の光コンセント。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、光ファイバーを用いた光信号伝送路の中継箇所において中継アダプタを設置するための光コンセントに関するものである。

【0002】

【従来の技術】従来の光コンセントとして、例えば特開平1-265211号公報に記載のように、電気配線用に形成されている既存の壁面埋込み型の配線器具を利用するものがある。

【0003】また、特開平1-123202号公報や特開平1-123203号公報に記載のように、埋込み型の箱本体に開閉蓋を設け、この開閉蓋にアダプタを固定

するものがある。

【0004】さらに、特開平7-191234号公報でも、埋込み用箱体の表面側に開閉蓋として機能する搖動体を設け、この搖動体にアダプタを固定している。

【0005】

【発明が解決しようとする課題】しかし、特開平1-265211号公報の光アダプタでは、アダプタをネジ締めして固定する構造となっており、光ファイバーケーブル端部に設けたコネクタを差込む角度が、配線器具の取付け枠の向きに応じて固定されたものとなってしまう。

【0006】また、特開平1-123202号公報、特開平1-123203号公報、および特開平7-191234号公報の光アダプタでは、開閉蓋等を可動にさせたりロックするための機構を収容するスペースが必要となる。さらに、開閉蓋等を固定するためのロックレバー、スプリング等の部品を多数必要とし、そのため組立工程も増加する。さらに、外部から差し込まれたコネクタが壁面や床面等に対してある程度の角度を持つこととなるので、光ファイバーケーブルが壁面等から浮いた形状となり、用途によっては、この浮き上がった部分で光ファイバーケーブルが破損するおそれがある。

【0007】そこで、この発明は、コネクタの差込む方向を簡易な機構で適宜変更可能な光コンセントを提供することを目的とする。

【0008】さらに、この発明は、コネクタの差込む角度を壁面や床に対して小さくして光ファイバーケーブルの破損のおそれを効果的に防止することができる光コンセントを提供することを目的とする。

【0009】

【課題を解決するための手段】上記課題を解決するため、請求項1の光コンセントは、一対の光ファイバーケーブルを接続するための中継アダプタを収容するものであって、底部中央に一方の光ファイバーケーブルを通す引込穴を有する本体部と、この本体部の上部を覆うとともに他方の光ファイバーケーブルの先端に設けたコネクタを差込むための開口を有する上蓋部とによって構成され、前記開口を外周4方向に選択的に向けた状態で前記上蓋部が前記本体部に着脱自在なケース部と、一方の光ファイバーケーブルの許容最小曲げ半径よりも大きな曲率半径の半円筒状の外周面を有するガイド部材と、ガイド部材を、外周面が本体部の4つの側壁の任意の1つに対向しつつこの外周面の軸が底面に平行になる状態で、本体部に着脱可能に支持する支持部材と、引込穴をへて外周面に沿って案内された一方の光ファイバーケーブルの先端に設けたコネクタを一端に嵌合させたアダプタを、このアダプタの他端が上蓋部に設けた開口に対向するように本体部側に支持するアダプタ固定手段とを備える。

【0010】また、請求項2の光コンセントは、アダプタ固定手段が、本体部の上端側に着脱可能に固定される

中蓋部材であることを特徴とする。

【0011】また、請求項3の光コンセントは、アダプタ固定手段が、アダプタをこのアダプタの軸が本体部の上端を含む平面に対してほぼ平行になるよう保持することを特徴とする。

【0012】また、請求項4の光コンセントは、アダプタ固定手段が、アダプタをこのアダプタの軸が本体部の上端を含む平面に対して所定以上の角となるよう保持することを特徴とする。

【0013】また、請求項5の光コンセントは、上蓋部が、その開口に他方の光ファイバーケーブルの先端に設けたコネクタが差し込まれていないときにこの開口を塞ぐキャップをこの開口周辺に保持するホルダを備えることを特徴とする。

【0014】

【発明の実施の形態】

(第1実施形態) 図1～図5は、第1実施形態の光コンセントを説明する図である。図1は、この光アダプタを取り付けた状態を示す斜視図であり、図2は、図1の光アダプタの内部構造を説明する断面図であり、図3は、図1の光アダプタの組立を説明する分解図であり、図4及び図5は、図1の光アダプタの要部を説明する図である。

【0015】図1に示すように、第1実施形態の光コンセント10、10は、壁面Wに形成した開口にはめ込む構造となっており、外観上は、上蓋部であるカバー20のみが現れる。このカバー20には、アダプタが収容される凸部21が形成されており、この凸部21に設けた開口22には、光ファイバーケーブルFC端に取り付けられたメールコネクタMCが差し込まれる。以下に詳細に説明するが、カバー20は取り外し可能になっており、内部に収容されたアダプタ等とともに90°単位で回転させてはめ込むことができるようになっている。したがって、その開口22を外観を損なうことなく上下左右の任意の方向に向けてセットすることができ、さらにには光ファイバーケーブルFCを上下左右の所望の方向に引出しができる。このことは、光ファイバーケーブルFCすなわちその内部に収容されている光ファイバーに加わるストレスを抑え得ることを意味する。

【0016】図2及び図3に示すように、光コンセント10は、升形の箱本体30と、箱本体30の上端部に固定される中蓋部材であるアダプタ固定台40と、箱本体30及びアダプタ固定台40を覆うカバー20とを備える。これらはすべて合成樹脂で組立はめ込み式の構造となっており、部品点数の低減が図られている。

【0017】箱本体30に設けたフランジ31には、適当な間隔で複数の固定用穴31aが設けられている。この固定用穴31aは、壁面Wに予め形成してある開口に箱本体30を底部32側からはめ込んだときに、この開口の縁部分にフランジ31をねじ止めするために利用さ

れる。なお、この箱本体30は、ビル等の建物の建設段階で壁面W等に予め固定的に埋設するタイプとしてもよい。箱本体の底部32は上下左右に対称な正方形で、その中央には光ファイバーケーブルFCを通す引込穴32aが形成されている。

【0018】箱本体の4つの側壁33、33、34、34には、それぞれの中央において縦に延びるリブ35、37が形成されている。また、4つの側壁33、33、34、34の底部両端側には、突起36、38が形成されている。一方の側壁33に設けたリブ35と突起36は、ガイド部材50を箱本体30内部に収容したときに、アダプタ固定台40の裏面に設けた突起41とともに、ガイド部材50を箱本体30内部の所定位置に位置決めして固定するための支持手段として機能する。

【0019】アダプタ固定台40は、引込穴32aから延びる光ファイバーケーブルFC端に設けたメールコネクタMC等を通すための開口40aと、アダプタ60の両側から延びる取付けステー62、62を持てする保持部材42、42とを備えており、周囲に設けた各ツメ43を箱本体30上部の溝39にはめ込むことにより箱本体30上部に着脱自在に固定することができる。

【0020】カバー20は、係止爪23によって箱本体30のフランジ31に着脱自在に固定される。この結果、箱本体30上部にセットされたアダプタ固定台40やアダプタ60もカバー20に覆われることとなり、カバー20に設けた凸部21の内側にアダプタ60が収容されることとなる。なお、凸部21に設けた開口22には、光ファイバーケーブルFCの先端に取り付けられたメールコネクタMCが差し込まれ、内部のアダプタ60の開口64にはめ込まれて固定される。

【0021】なお、凸部21に設けた開口22には、防塵等を目的とするキャップ70をはめ込むことができるようになっている。このキャップ70には、開口22にはまり込む嵌合部71の反対側に着脱用のつまみ72が設けてある。

【0022】図2及び図4を参照して、ガイド部材50を箱本体30内の所定位置に固定する方法について説明する。ガイド部材50端部に設けた支持板51の上下端は、突起38、41とリブ37との間に挟まれる。さらに、箱本体30上部にアダプタ固定台40を固定すると、この支持板51の左右端が、アダプタ固定台40と底部32との間に挟まれる。この結果、ガイド部材50は、その半円筒部52の外周面が側壁33に対向しつつこの半円筒部52の軸が底部32の平面に平行になった状態で位置合わせされて固定される。なお、半円筒部52の外周面は、光ファイバーケーブルFCの許容最小曲げ半径よりも大きな曲率半径を有している。したがって、半円筒部52の外周面に光ファイバーケーブルFCを案内させるならば、光ファイバーケーブルFCに引張り力が加わっても光ファイバーケーブルFCが折れて破

損する等の弊害を防止することができる。

【0023】ガイド部材50は、箱本体30中に4方向に向きを変えて配置することができる。

【0024】例えば、図2の一点鎖線で示すように、ガイド部材50を箱本体30下側に配置することができる。この場合、半円筒部の外周面は下向に凸となって下側の側壁33に対向することとなる。一方、側壁33に設けたリブ35と突起36も、アダプタ固定台40の裏面に設けた突起41とともに、ガイド部材50を箱本体30内部に固定するための支持手段として機能する。すなわち、ガイド部材50は、その半円筒部52の外周面が左右いずれかの側壁34に対向しかつこの半円筒部52の軸が底部32の平面に平行になるように箱本体30中に固定される。つまり、ガイド部材50は、その半円筒部52の外周面が箱本体30の4つの側壁33、33、34、34の任意の1つに対向する状態で箱本体30中に着脱可能に支持される。

【0025】図5は、アダプタ60の固定方法を説明する図である。アダプタ60の両側から延びる取付けステー62は、アダプタ固定台40に設けた一对の保持部材42、42に把持されて固定される。なお、両保持部材42、42の対向面には、アダプタ固定台40の本体側に向けて間隔が擴くなるテバ状のリブ42a、42bが設けられており、カバー20を箱本体30に固定すると、その凸部21内面に設けた突起21aが取付けステー62を押圧することとなる。この結果、アダプタ60に設けた取付けステー62がアダプタ固定台40に設けたリブ42a、42bに押し付けられて両保持部材42、42にしっかりと固定されることとなる。

【0026】ここで、アダプタ固定台40は、ガイド部材50とともに、箱本体30の底部32に垂直な中心軸の回りの4方向に簡易に着脱可能に固定できる。また、カバー60も、ガイド部材50やアダプタ固定台40とともに、箱本体30の底部32に垂直な中心軸の回りの4方向に簡易に固定可能である。したがって、箱本体30を壁面Wに固定したまま、ガイド部材50、アダプタ固定台40、アダプタ60、カバー20等を90°づつ回転した位置に着脱自在に固定することができ、光ファイバーケーブルFCを上下左右の所望の方向に引出すことができる。しかも、図からも明らかのように、カバー20の凸部21の壁面Wからの突出量を内蔵するアダプタ60の厚み程度としたままで、光ファイバーケーブルFCを光コンセント10から壁面Wに沿ってほぼ平行に引出すことができる。このように光ファイバーケーブルFCの引出し方向を上下左右の任意の方向に設定でき、壁面Wからの突出量も小さくできることから、光ファイバーケーブルFCの取り回しの際の曲げによって生じる伝送損失を低減することができ、家具等の設備の背面の押さえつけによる光ファイバーケーブルFCの破損のおそれも低減することができる。

【0027】(第2実施形態)図6及び図7は、第2実施形態の光コンセント110の構造を説明する図である。なお、第2実施形態の光アダプタは、第1実施形態の光アダプタの変形例であり、アダプタ60の固定角度が第1実施形態のものと異なるが、他の点で第1実施形態と共通する。したがって、同一部分には同一符号を付して重複説明を省略する。

【0028】図6に示すように、アダプタ60は、その光軸AXがアダプタ取付台40に対して角θだけずれた角度となるように固定されている。

【0029】図7は、アダプタ固定台40等の部分拡大断面図であり、アダプタ60を傾けたままで固定するための機構を説明する図である。アダプタ60から延びる取付けステー62は、アダプタ固定台40に傾いた状態で立設された一对の保持部材142、142に把持されて固定される。なお、両保持部材142、142の対向面にはリブ142a、142bが設けられており、カバー20を箱本体30に固定すると、その凸部21内面に設けた突起21aが取付けステー62を押圧することとなる。この結果、アダプタ60に設けた取付けステー62がアダプタ固定台40に設けた両保持部材142、142にしっかりと固定され、アダプタ60を所望の角度θだけ傾けたままで固定することができる。

【0030】(第3実施形態)図8は、第3実施形態に係る光コンセント10の構造を説明する図である。第3実施形態の光アダプタ210のカバー220は、第2実施形態の光アダプタのカバー20を変形したものである。このカバー220には、キャップ70用のホールドとして、一对のピン26、26が近接して立設されている。両ピン26、26の幅はキャップ70に設けたつまみ72のネック部分の幅にほぼ等しくなっており、両ピン26、26の間につまみ72を挟むことによりキャップ70をカバー220に吊持することができ、キャップ70の保管が容易となる。

【0031】

【発明の効果】請求項1の光コンセントでは、支持部材が、一方の光ファイバーケーブルの許容最小曲げ半径よりも大きな曲率半径の半円筒状の外周面を有するガイド部材を、外周面が本体部の4つの側壁の任意の1つに対向しかつこの外周面の軸が底面に平行になる状態で本体部に着脱可能に支持するので、引込穴をへて外周面に沿って案内された一方の光ファイバーケーブルの先端に設けたコネクタを一端に嵌合させたアダプタの軸は、本体部の4つの側壁のいずれの方向に向けることも可能である。したがって、他方の光ファイバーケーブルの先端に設けたコネクタをアダプタに差込む方向を本体部周囲の4方向のいずれか1つに適宜設定できるとともに、この差込み方向を簡易に変更することができる。

【図面の簡単な説明】

【図1】 第1実施形態に係る光コンセントを壁面に取

り付けた状態を説明する図である。

【図2】 図1の光アダプタの断面構造を説明する図である。

【図3】 図1の光アダプタの組立を説明する図である。

【図4】 図1の光アダプタの要部を説明する図である。

【図5】 図1の光アダプタの要部を拡大して説明する断面図である。

【図6】 第2実施形態に係る光コンセントの断面構造を説明する図である。

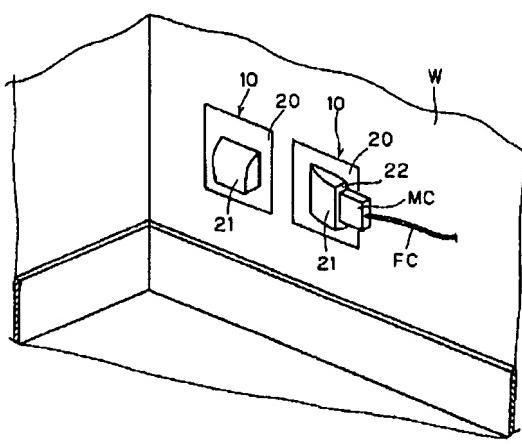
【図7】 図1の光アダプタの要部を拡大して説明する断面図である。

【図8】 第3実施形態に係る光コンセントを説明する図である。

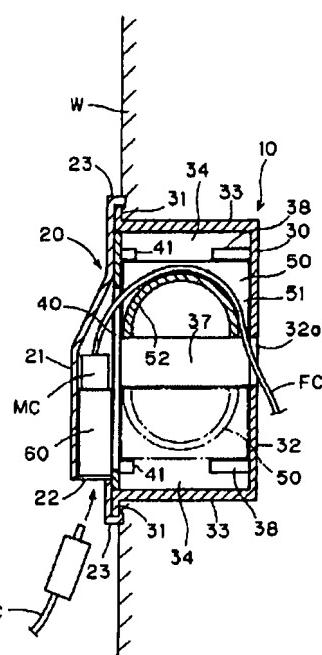
【符号の説明】

10	コンセント
20	カバー
22	開口
30	箱本体
32	底部
33、34	側壁
35、37	リブ
36、38	突起
40	アダプタ固定台
50	ガイド部材
52	半円筒部
60	アダプタ
70	キャップ
72	つまみ

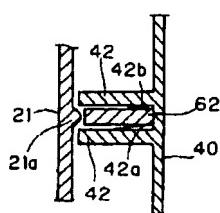
【図1】



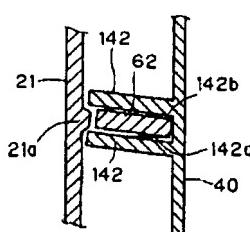
【図2】



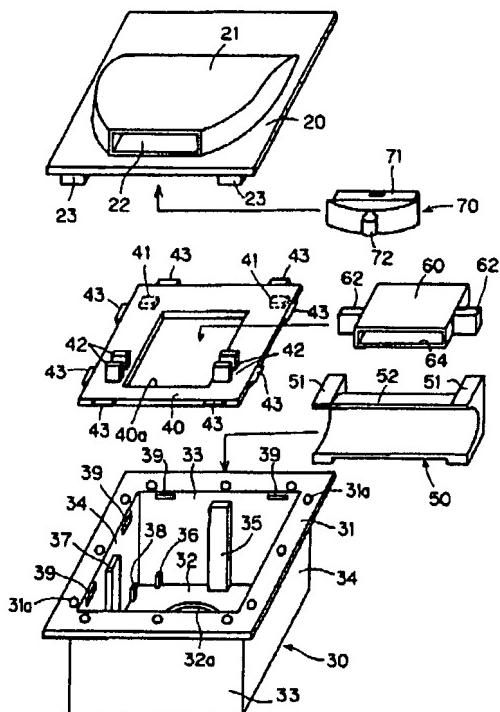
【図5】



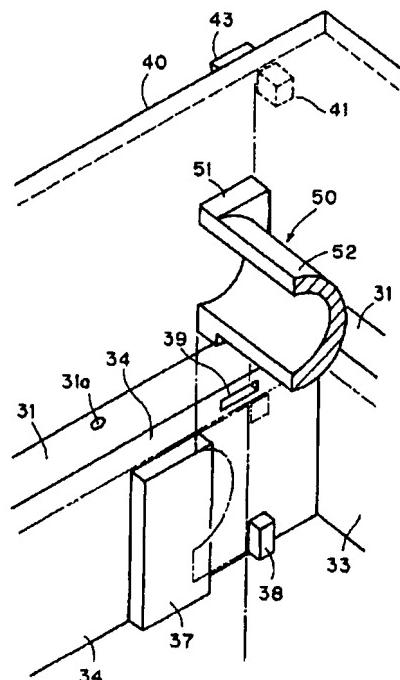
【図7】



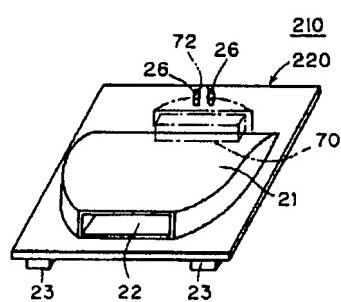
〔図3〕



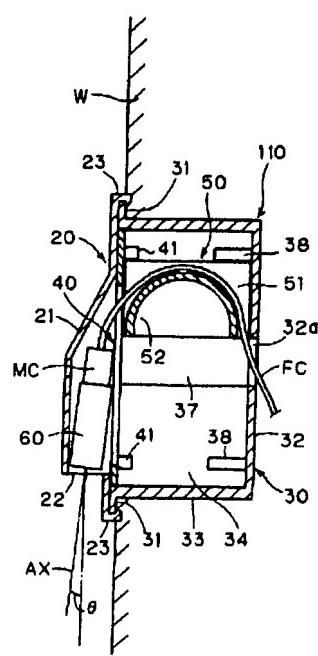
(图4)



〔四八〕



[图6]



D4 Smritano

Translation of Japanese Unexamined Patent Application

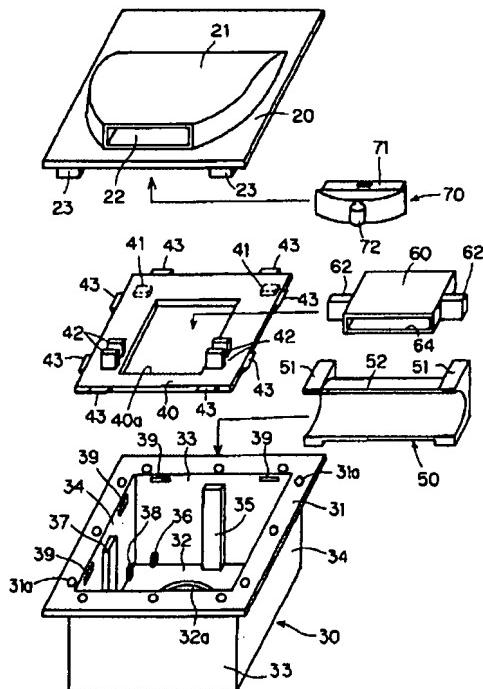
OPTICAL SOCKET [1]*

Publication No.	9-243859
Publication Date	19 September 1997
Inventor	Kenji URASHIRO
Applicant	Sumitomo Wiring Systems, Ltd.
Int. Cl. ⁶	G02B 6/36
Application No.	8-051820
Filing Date	8 March 1996

Abstract

TASK: To provide an optical socket wherein a simple mechanism enables the direction in which a connector is inserted to be altered as required.

SOLUTION: An adapter fixing base 40 can be easily and detachably fixed, together with guide member 50, in four ways around a centre axis perpendicular to base portion 32 of box body 30. Cover 20 can also be easily and detachably fixed, along with guide member 50 and adapter fixing base 40, in four ways around the centre axis perpendicular to base portion 32 of box body 30. Consequently, despite box body 30 being left fixed to the wall, guide member 50, adapter fixing base 40, adapter 60 and cover 20, etc., can be detachably fixed in positions defined by successive 90° rotations, and an optical fibre cable FC [2] can be led out in a desired one of the four directions of up, down, left and right. Consequently, transmission loss incurred due to bending when managing optical fibre cable FC can be decreased, and the risk of breakage or damage of optical fibre cable FC due to the back of equipment or installations such as furniture pressing against it can be decreased.



* Numbers in square brackets refer to Translator's Notes appended to the translation.

Claims

1. An optical socket for housing an adapter for connecting a pair of optical fibre cables, said optical socket comprising:
 - a casing comprising (i) a body having in the centre of its base portion a lead-in hole through which a first optical fibre cable can be passed, and (ii) a top cover for covering the top of said body, said top cover having an opening for insertion of a connector provided on an end of a second optical fibre cable; wherein said top cover is attachable to and detachable from said body with said opening selectively turned towards one of four peripheral directions [3];
 - 10 a guide member having a semi-cylindrical outer peripheral face with a radius of curvature that is larger than the minimum permissible bending radius of said first optical fibre cable;
 - 15 a support member [4] for removably supporting said guide member in said body, with said outer peripheral face opposing an arbitrary one of the four sidewalls of said body, and with the axis of the outer peripheral face parallel to the base of said body; and
 - 20 an adapter fixing means for supporting an adapter into one end of which is fitted a connector provided at the end of said first optical fibre cable that has been led through said lead-in hole and over said outer peripheral face, said adapter being supported in said body in such manner that the other end of the adapter faces said opening that has been provided in said top cover.
- 25 2. The optical socket according to Claim 1, characterised in that said adapter fixing means is an intermediate cover member detachably fixed to the top end of said body.
- 30 3. The optical socket according to Claim 1, characterised in that said adapter fixing means holds said adapter so that the axis of the adapter is approximately parallel to the plane that includes the top end of said body.
- 35 4. The optical socket according to Claim 1, characterised in that said adapter fixing means holds said adapter so that the axis of the adapter forms a prescribed or greater angle to the plane that includes the top end of said body.
5. The optical socket according to Claim 1, characterised in that said top cover provides a holder for holding a cap for sealing said opening when the connector provided at the end of said second optical fibre cable is not inserted in the opening, said holder serving to hold the cap in the vicinity of the opening.

Detailed Description of the Invention

Technical field of the invention

(1) The present invention relates to an optical socket for setting up an adapter at a position where two sections of an optical fibre based optical signal line are to be connected.*

Prior art

(2) Conventional optical sockets include those which utilise an existing flush-mounted wiring fixture formed for electrical wiring, as described for example in Japanese Unexamined Patent Application, Publication No. 1-265211.

10 (3) Conventional optical sockets also include those which provide an openable cover on a flush-mounted box body and fix an adapter on this openable cover, as described in Japanese Unexamined Patent Applications, Publication Nos. 1-123202 and 1-123203.

15 (4) In addition, Japanese Unexamined Patent Application, Publication No. 7-191234 describes fixing an adapter to a swinging body provided on the face of a flush-mounted box body and functioning as an openable cover.

Problems that the invention will solve

(5) However, the optical adapter [5] of Japanese Unexamined Patent Application, Publication No. 1-265211, employs a structure which fixes an adapter by screwing it 20 into position, which means that the angle at which a connector provided on the end of an optical fibre cable is inserted is determined by the orientation of the mounting frame of the wiring fixture.

(6) The optical adapters [6] of Japanese Unexamined Patent Applications, Publication Nos. 1-123202, 1-123203, and 7-191234 require a space for housing a mechanism 25 for making an openable cover, etc., movable, and for locking this cover. They also require a large number of parts such as lock levers and springs in order to fasten the openable cover, etc., with the result that assembly involves extra steps. Furthermore, because a connector that is inserted into the adapter from outside ends up being angled to some extent to the wall or the floor, the optical fibre cable will stand out 30 from the wall, etc. and in some applications there will be a risk of damage to that portion of the cable which stands out in this way.

(7) It is therefore an object of this invention to provide an optical socket wherein a simple mechanism enables the direction in which a connector is inserted to be altered as required.

* Numbers in round brackets at the beginning of paragraphs correspond to the paragraph numbering in the Japanese patent document.

(8) It is a further object of this invention to provide an optical socket which reduces the insertion angle of a connector with respect to the wall or floor, thereby effectively avoiding the risk of damage to an optical fibre cable.

Means for solving problems

5 (9) In order to solve the above-mentioned problems, the optical socket according to Claim 1 houses an adapter for connecting a pair of optical fibre cables, and comprises:

10 a casing comprising (i) a body having in the centre of its base portion a lead-in hole through which a first optical fibre cable can be passed, and (ii) a top cover for covering the top of the body, this top cover having an opening for insertion of a connector provided on an end of a second optical fibre cable; wherein the top cover is attachable to and detachable from the body with the opening selectively turned towards one of four peripheral directions;

15 a guide member having a semi-cylindrical outer peripheral face with a radius of curvature that is larger than the minimum permissible bending radius of the first optical fibre cable;

a support member for removably supporting the guide member in the body, with the outer peripheral face opposing an arbitrary one of the four sidewalls of the body, and with the axis of the outer peripheral face parallel to the base of the body; and

20 an adapter fixing means for supporting an adapter into one end of which is fitted a connector provided at the end of the first optical fibre cable that has been led through the lead-in hole and over the outer peripheral face, this adapter being supported in the body in such manner that the other end of the adapter faces the opening that has been provided in the top cover.

25 (10) The optical socket according to Claim 2 is characterised in that the adapter fixing means is an intermediate cover member detachably fixed to the top end of the body.

(11) The optical socket according to Claim 3 is characterised in that the adapter fixing means holds the adapter so that the axis of this adapter is approximately parallel to the plane that includes the top end of the body.

30 (12) The optical socket according to Claim 4 is characterised in that the adapter fixing means holds the adapter so that the axis of this adapter forms a prescribed or greater angle to the plane that includes the top end of the body.

(13) The optical socket according to Claim 5 is characterised in that the top cover provides a holder for holding a cap for sealing the opening when the connector provided at the end of the second optical fibre cable is not inserted in this opening, this holder serving to hold the cap in the vicinity of the opening.

Modes of practising the invention

First embodiment

(14) FIGS. 1 to 5 serve to clarify an optical socket according to a first embodiment of the present invention. FIG. 1 is a perspective view showing this optical adapter [7] fitted to a wall. FIG. 2 is a sectional view serving to clarify the internal structure of the optical adapter [8] of FIG. 1. FIG. 3 is an exploded view serving to clarify the assembly of the optical adapter of FIG. 1. FIG. 4 and FIG. 5 serve to clarify essential elements of the optical adapter of FIG. 1.

(15) As shown in FIG. 1, optical sockets 10 and 10 according to this first embodiment are designed to be set into an opening formed in wall W, so that externally only cover 20, which is the top cover, is visible. Convex part 21 in which an adapter can be housed is formed on this cover 20, and a male connector MC fitted to an end of optical fibre cable FC is inserted into opening 22 provided in this convex part 21. Cover 20 is removable and can be fitted in place in orientations obtained by successive rotations of 90°, along with the adapter and other elements that are housed beneath it. This will be described subsequently in greater detail. Consequently, opening 22 in the convex part of the cover can be set facing any of the four directions of up, down, left and right, without impairing the external appearance, and optical fibre cable FC can be led out in a desired one of the four directions of up, down, left and right. This means that stress acting on optical fibre cable FC — i.e., on the optical fibre housed within this cable — can be suppressed.

(16) As shown in FIG. 2 and FIG. 3, optical socket 10 comprises open-top box body 30, adapter fixing base 40 which is an intermediate cover member that is fixed to the top end of box body 30, and cover 20 for covering box body 30 and adapter fixing base 40. All of these are made of synthetic resin and are designed to be assembled by being snapped together, thereby reducing the number of parts involved.

(17) A plurality of fixing holes 31a are provided at suitable intervals on flange 31 provided on box body 30. When fitting box body 30 (leading with base portion 32) into an opening that has been formed in advance in wall W, these fixing holes 31a are utilised to screw flange 31 to the edge portion of this opening. It may be noted that this box body 30 may alternatively be of a type that is fixedly recessed in advance in wall W etc. at the construction stage of the building or other structure. Base portion 32 of the box body is square and therefore has up-down and left-right symmetry. Lead-in hole 32a through which an optical fibre cable FC can be passed is formed in the centre of base portion 32.

(18) Longitudinally extending ribs 35 and 37 are formed respectively on the four sidewalls 33 and 33, and 34 and 34, of the box body, at the centre of each sidewall. Projections 36 and 38 are formed at the bottom of, and at both ends of, each of the

four sidewalls 33 and 33 and 34 and 34. Together with projections 41 provided on the rear face of adapter fixing base 40, ribs 35 and projections 36 provided on sidewalls 33 function as a support means for positioning and fixing guide member 50 in a prescribed position inside box body 30 when the guide member is housed inside the
5 box body.

(19) Adapter fixing base 40 is provided with (i) opening 40a through which a male connector MC, etc. can be passed, said male connector being provided on the end of optical fibre cable FC extending from lead-in hole 32a, and (ii) holding members 42 and 42 for gripping attachment stays 62 and 62 extending from the two sides of
10 adapter 60. Adapter fixing base 40 can be detachably fixed to the top of box body 30 by fitting peripherally provided claws 43 into grooves 39 around the top of box body 30.

(20) Cover 20 is detachably fixed to flange 31 of box body 30 by means of latching hooks 23. As a result, both adapter fixing base 40 and adapter 60, these having been
15 set in position at the top of box body 30, are covered by cover 20, and adapter 60 is housed on the inside of convex part 21 provided on cover 20. It may be noted that male connector MC fitted to an end of optical fibre cable FC is inserted into opening 22 provided in convex part 21 and is fixed by being fitted into opening 64 of adapter 60 inside the convex part.

20 (21) It is further noted that cap 70 serving the purpose of dust prevention and the like can be fitted into opening 22 provided in convex part 21. Finger grip 72 to aid fitting and removal is provided on cap 70 on the side opposite fitting part 71 which is inserted into opening 22.

(22) The method of fixing guide member 50 in a prescribed position inside box body
25 30 will now be described with reference to FIG. 2 and FIG. 4. The top and bottom sides of support plate 51 provided at an end of guide member 50 are gripped between projections 38 and 41, and rib 37. In addition, when fixing adapter fixing base 40 to the top of box body 30, the left and right sides of this support plate 51 are gripped between adapter fixing base 40 and base portion 32. As a result, guide member 50 is
30 aligned and fixed in a position such that the outer peripheral face of its semi-cylindrical part 52 opposes sidewall 33 and the axis of this semi-cylindrical part 52 is parallel to the plane of base portion 32. It may be noted that the outer peripheral face of semi-cylindrical part 52 has a radius of curvature which is larger than the minimum permissible bending radius of optical fibre cable FC. Consequently, when optical fibre
35 cable FC is guided by the outer peripheral face of semi-cylindrical part 52, then despite tensile force being applied to the optical fibre cable, adverse effects such as damage or breakage caused by bending of the optical fibre cable can be prevented.

- (23) Guide member 50 can be arranged inside box body 30 in four different orientations.
- (24) For example, as shown by the dash-and-dot lines in FIG. 2, guide member 50 can be arranged in the lower part of box body 30. In this case, the outer peripheral face of the semi-cylindrical part provides a downwards-facing convex shape and opposes bottom sidewall 33. Together with projection 41 provided on the rear face of adapter fixing base 40, rib 35 and projection 36 provided on a sidewall 33 function as a support means for fixing guide member 50 inside box body 30. That is to say, guide member 50 is fixed inside box body 30 in such manner that the outer peripheral face of its semi-cylindrical part 52 opposes either right or left sidewall 34 and the axis of this semi-cylindrical part 52 is parallel to the plane of base portion 32. Namely, guide member 50 is removably supported inside box body 30 with the outer peripheral face of its semi-cylindrical part 52 facing an arbitrary one of the four sidewalls 33, 33, 34 and 34 of box body 30.
- (25) FIG. 5 serves to clarify the method of fixing adapter 60 in place. Attachment stays 62 extending from the two sides of adapter 60 are fixed by being gripped in pairs of holding members 42 and 42 provided on adapter fixing base 40. It may be noted that tapered ribs 42a and 42b are provided on opposing faces of the two pairs of holding members 42 and 42, these ribs tapering in such manner that the gap between them narrows in the direction of adapter fixing base 40. When cover 20 is fixed on box body 30, projections 21a provided on the inside of convex part 21 of the cover press against attachment stays 62. As a result, attachment stays 62 provided on adapter 60 are squeezed by ribs 42a and 42b provided on adapter fixing base 40 and are thereby fixed firmly in both pairs of holding members 42 and 42.
- (26) In this embodiment, adapter fixing base 40, along with guide member 50, can be easily and detachably fixed in four ways around a centre axis perpendicular to base portion 32 of box body 30. Cover 60 [9] can also be easily fixed, along with guide member 50 and adapter fixing base 40, in four ways around the centre axis perpendicular to base portion 32 of box body 30. Consequently, despite box body 30 being left fixed to wall W, guide member 50, adapter fixing base 40, adapter 60 and cover 20, etc., can be detachably fixed in positions defined by successive 90° rotations, and optical fibre cable FC can be led out in a desired one of the four directions of up, down, left and right. As will also be evident from the drawings, optical fibre cable FC can be led out from optical socket 10 approximately parallel to wall W, with the amount of protrusion from wall W of convex part 21 of cover 20 being made equivalent to the thickness of incorporated adapter 60. Because the direction in which optical fibre cable FC is led out in this manner can be set in an arbitrary one of the four directions of up, down, left and right, and because the

amount of protrusion from wall W can be made small, transmission loss incurred due to bending when managing optical fibre cable FC can be decreased, and the risk of breakage or damage of optical fibre cable FC due to the back of equipment or installations such as furniture pressing against it can be decreased.

5 **Second embodiment**

(27) FIG. 6 and FIG. 7 serve to clarify the structure of an optical socket 110 according to a second mode of practising the present invention. It may be noted that the optical adapter of this second embodiment is a modified version of the optical adapter of the first embodiment, being fixed at a different angle from that of the adaptor of the first 10 embodiment, but otherwise being identical. Accordingly, identical referencing numerals are assigned to identical elements and duplicate descriptions are omitted.

(28) As shown in FIG. 6, adapter 60 is fixed in such manner that its optical axis AX is skewed at an angle θ with respect to adapter fixing base 40.

(29) FIG. 7 is a partial enlarged section of adapter fixing base 40 and related 15 elements, and serves to clarify the mechanism whereby adapter 60 is fixed at a slant. Attachment stays 62 extending from adapter 60 are fixed by being gripped by pairs of holding members 142 and 142 arranged upright but at a slant on adapter fixing base 40. Ribs 142a and 142b are provided on opposing faces of both pairs of holding members 142 and 142, and when cover 20 is fixed to box body 30, projections 21a 20 provided on the inside of convex part 21 of the cover press against attachment stays 62. As a result, attachment stays 62 provided on adapter 60 are fixed firmly in both pairs of holding members 142 and 142 provided on adapter fixing base 40, whereby adapter 60 can be fixed at an inclination of desired angle θ .

Third embodiment

(30) FIG. 8 serves to clarify the structure of optical socket 10 [10] according to a third 25 mode of practising the present invention. Cover 220 of optical adapter 210 [11] in this third embodiment is a modified version of cover 20 of the optical adapter of the second embodiment. A pair of mutually adjacent pins 26 and 26 are provided in upright fashion on cover 220 as holders for cap 70. The width between pins 26 and 26 30 is approximately equal to the width of the neck portion of finger grip 72 that is provided on cap 70, and cap 70 can be hung on cover 220 [12] by interposing finger grip 72 between pins 26 and 26, whereby safekeeping of cap 70 becomes easy.

Effects of the invention

(31) With the optical socket of Claim 1, support members detachably support, in the 35 body of the socket, a guide member having a semi-cylindrical outer peripheral face with a radius of curvature that is larger than the minimum permissible bending radius of a first optical fibre cable, with the outer peripheral face opposing an arbitrary one of four sidewalls of the body and the axis of this outer peripheral face parallel to the

base. The axis of an adapter can also face a direction corresponding to any of the four sidewalls of the body, one end of this adapter having inserted into it a connector provided on an end of the first optical fibre cable that has been led through a lead-in hole and over the outer peripheral face. Consequently, the direction in which a
 5 connector provided at the end of a second optical fibre cable is inserted into the adapter can be set as required in any one of four directions around the body, and this insertion direction can be easily changed.

Brief Description of the Drawings

FIG. 1 serves to clarify the situation where optical sockets according to a first
 10 mode of practising the present invention have been fitted to a wall.

FIG. 2 serves to clarify the cross-sectional structure of the optical adapter [13] of FIG. 1.

FIG. 3 serves to clarify the assembly of the optical adapter of FIG. 1.

FIG. 4 serves to clarify essential elements of the optical adapter of FIG. 1.

15 FIG. 5 is an enlarged cross-section serving to clarify essential elements of the optical adapter of FIG. 1.

FIG. 6 serves to clarify the cross-sectional structure of an optical socket according to a second mode of practising the present invention.

20 FIG. 7 is an enlarged cross-section serving to clarify essential elements of the optical adapter of FIG. 1.

FIG. 8 serves to clarify an optical socket according to a third mode of practising the present invention.

Explanation of referencing numerals

- 10.....socket
- 20.....cover
- 22.....opening
- 30.....box body
- 32.....base portion
- 33, 34sidewalls
- 35, 37ribs
- 36, 38projections
- 40.....adapter fixing base
- 50.....guide member
- 52.....semi-cylindrical part
- 60.....adapter
- 70.....cap
- 72.....finger grip

FIG. 1

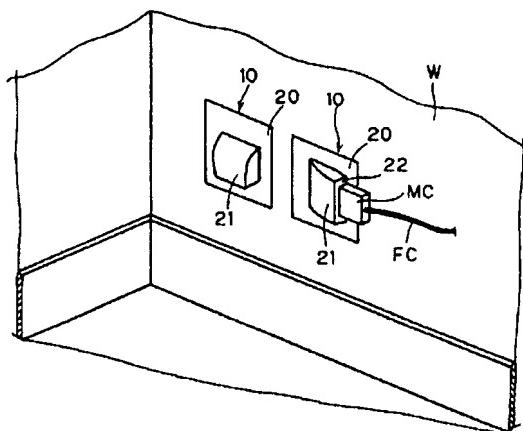


FIG. 2

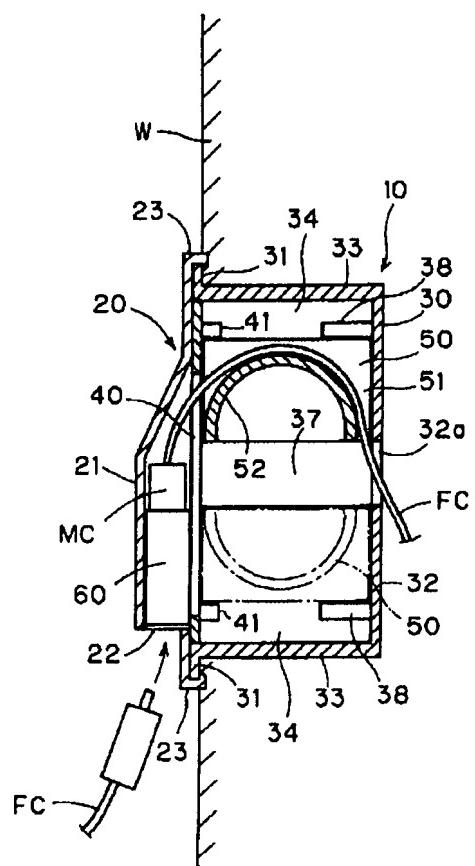


FIG. 3

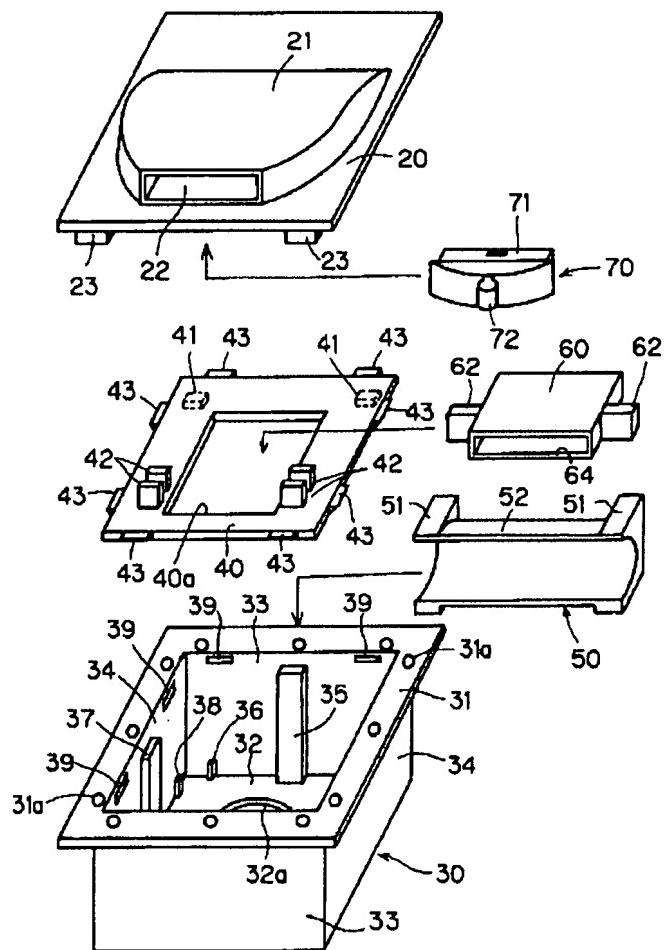


FIG. 4

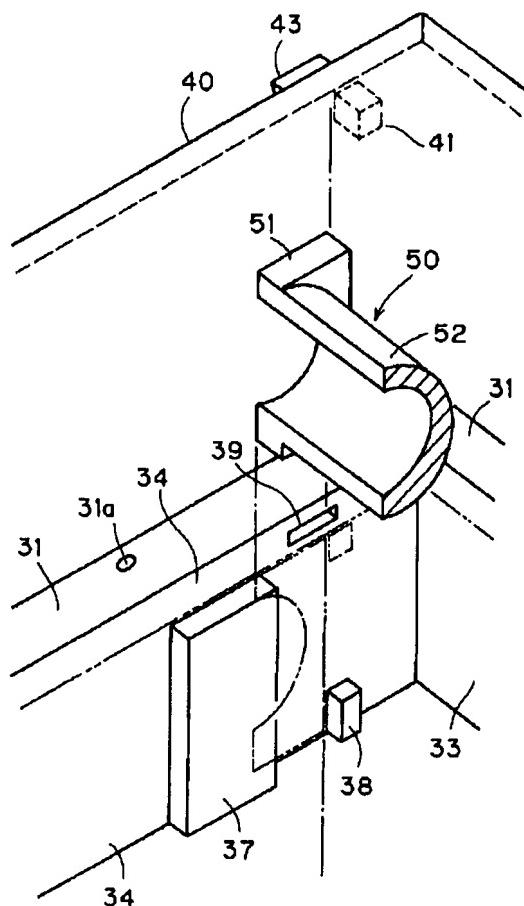


FIG. 5

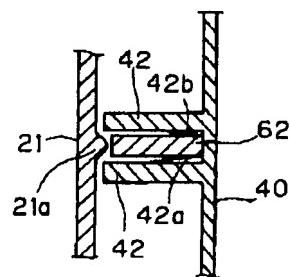


FIG. 6

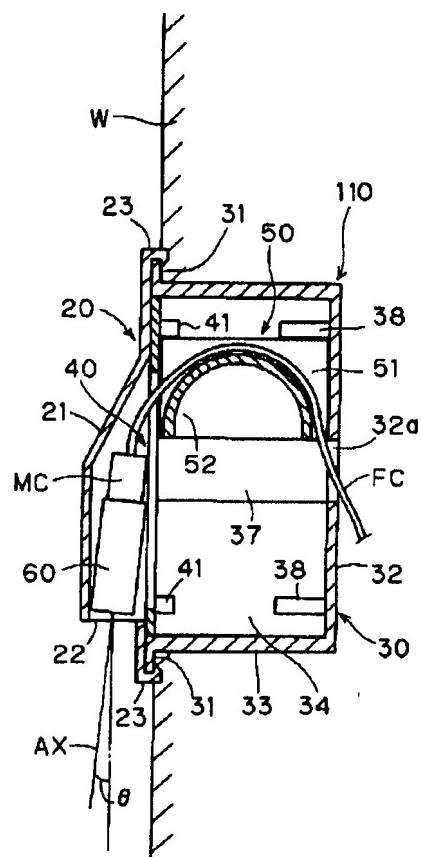


FIG. 7

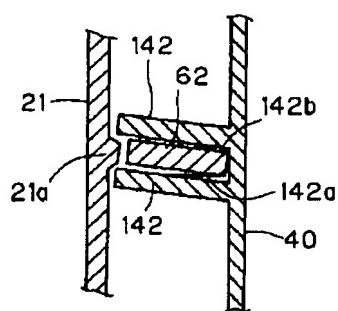
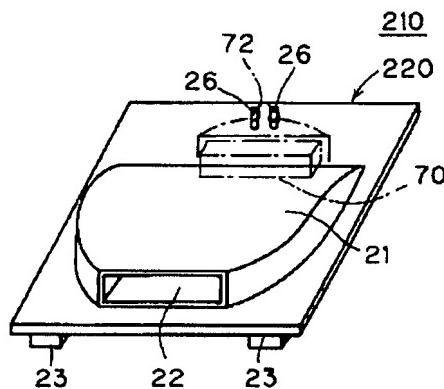


FIG. 8



TRANSLATOR'S NOTES

1. The Japanese word that I have rendered as "socket" is often translated as "wall socket" or "plug socket". However, I have followed the English-language abstract given in the JPO database and used simply "socket".
2. Optical fibre cable FC is not illustrated in the drawing selected to illustrate the abstract. See FIG. 1 and FIG. 2 for a view of this optical fibre cable.
3. The Japanese that I have translated as "turned towards one of four peripheral directions" is literally "turned towards four peripheral directions". I have added the words "one of" to make sense of the statement. I have employed this same clarification in other parts of the translation.
4. Even in patent specifications, Japanese frequently does not distinguish between singular and plural. My understanding of the structure of the optical socket of the invention is that the so-called support member in fact comprises a plurality of ribs and other projections, which in their plurality serve to support and hold in position the guide member.
5. Sic. "Optical adapter" is here presumably erroneous for "optical socket".
6. Sic. Again, "optical adapter" is presumably erroneous for "optical socket".
7. Sic. "optical adapter" is presumably erroneous for "optical socket". Properly speaking, the present invention is an optical socket, one element of which is an optical adapter.
8. Sic. Here, and in the remainder of this paragraph, "optical adapter" is erroneously used instead of "optical socket". The detailed description of the invention makes it clear that the adapter is only one element of the overall optical socket.
9. Sic. This is an erroneous reference. The writer must mean either cover 20 or adapter 60.
10. Sic. "Optical socket 10" is presumably erroneous for "optical socket 210".
11. Sic. "Optical adapter 210" is presumably erroneous for "optical socket 210".
12. The Japanese has "cover 20". I have corrected this to "cover 220".
13. Sic. "Optical adapter" is erroneous for "optical socket". This same error is made in the subsequent drawing descriptions.

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PN - JP9243859 A 19970919
 PD - 1997-09-19
 PR - JP19960051820 19960308
 OPD- 1996-03-08
 TI - OPTICAL SOCKET
 IN - URASHIRO KENJI
 PA - SUMITOMO WIRING SYSTEMS
 IC - G02B6/36

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- TI - Optical outlet for signal transmission - has adaptor for connecting optical fibre cable which is guided along peripheral surface of guide member and supported on main body by support member
 PR - JP19960051820 19960308
 PN - JP9243859 A 19970919 DW199748 G02B6/36 006pp
 PA - (SUME) SUMITOMO DENSO KK
 IC - G02B6/36
 AB - J09243859 The outlet is attached to a relay adaptor (60) which connects a pair of optical fibre cables. A connector provided at one end of the optical fibre cable is inserted into an aperture of a cover (20) of a main body (30). The aperture of the detachable cover is selectively turned to anyone of the core peripheral directions.
 - A semicircle tubular guide member 50) with radius of curvature larger than the minimum bend radius of the optical fibre cable is arranged with its peripheral surface parallel to the base. The adaptor is guide along the peripheral surface of the guide member and is supported by the main body by a detachable support member (40).
 - USE/ADVANTAGE - In wall surface embedded type wiring accessories. Alters pushing direction of cable, simply.
 - (Dwg.3/8)

OPD- 1996-03-08

AN - 1997-516819 [48]

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- PN - JP9243859 A 19970919
 PD - 1997-09-19
 AP - JP19960051820 19960308
 IN - URASHIRO KENJI
 PA - SUMITOMO WIRING SYST LTD
 TI - OPTICAL SOCKET
 AB - PROBLEM TO BE SOLVED: To make it possible to change the put-in direction of a connector with a simple mechanism by attachably/detachably fixing an adapter fixing means to a main body part.
 - SOLUTION: A mail connector MC attached to an optical fiber cable FC end is put into an opening 22 provided on a projection part 21 of a cover 20. An adapter fixing base 40 is provided with the opening for passing through the mail connector MC, etc., provided on the optical fiber cable FC end prolonging from a draw-in hole 32a to be fixed to a box main body 30 attachably/detachably. The adapter fixing base 40 is fixed easily and attachably/ detachably in the four directions around a central axis perpendicular to the bottom part 32 of the box main body 30 together with the guide member 50 of the optical fiber cable FC. Thus, the guide member 50, the adapter fixing base 40, an adapter 60 and the cover 20 are fixed to the position turning each by 90 deg. attachably/detachably while fixing the box main body 30 to a wall surface W.
 | - G02B6/36